DETAILED ACTION

Election/Restrictions

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, Claims 1-10 & 12, drawn to "A curable liquid resin composition."

Group II, Claim 11, drawn to "A process for producing a cured product."

2. The inventions listed as Groups I & II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Uchida et al. (WO 200147824 A) teach a coated optical fiber comprising an outer coating layer cured with a coating composition comprising a urethane methacrylate, a polymerizable monomer of methacrylate, and an initiator, which is substantially identical to the claimed invention. As the special technical feature is found in prior art, unity is therefore lacking.

3. During a telephone conversation with Bryan Davidson on 07 February 2008 a provisional election was made without traverse to prosecute "A curable liquid resin composition," Claims 1-10 & 12. Affirmation of this election must be made by applicant in replying to this Office action. Claim 11 is withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) The invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the U.S.

6. Claims 1-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Takehana, et al. {Takehana} (US 6337118 B1) with evidence from Furukawa (*Physical Chemistry of Polymer Rheology*).

Regarding Claim 1, Takehana teaches substantially identical photocurable adhesive resin compositions with sufficient specificity comprising a methacrylate urethane (A), monomer (B), and photo-initiator (C) ({Takehana} Claims 1 & 5). In one particular example, the ratios are 30 (A) : 30 (B) : 2(C) ({Takehana} Table 1). Monomer (B) is polymerizable by virtue of it being incorporated into the polymer when photoinitiated and polymerized ({Takehana} C10:L47-49). Regarding Claims 1 & 2, the glass transition temperature is taught to be between -50- to 200°C and most preferably between 0- to 120°C ({Takehana} C12:L41-51). Regarding Claims 1 & 3, glass

transition time appears to be the only non-constant or non-integer factor in a general estimation of the relaxation time of a polymer ({Furukawa} Pages 146, 149, & 150 | Equations 16.27 & 17.1). Since the same polymeric materials will generally exhibit the same glass transition and time relaxation properties, the polymer compositions taught by Takehana appears to have the stress relaxation times as the claimed invention.

Regarding Claim 4, components of (A) include a polyether polyol, diisocyanate, and hydroxyl group containing methacrylate ({Takehana} C2:L15-17, C2:L27-29, C4:L48, & C5:L1). Regarding Claims 5, 7, & 8, a copolymer of tetrahydrofuran and methyltetrahydrofuran is used with bisphenol-A-epoxy acrylate ({Takehana} Example 4), which corresponds with Applicant's embodiment ({Applicant} [0017]). Regarding Claims 6 & 7, an aliphatic polyether polyol such as polypropylene glycol is taught ({Takehana} C2:L30-32 & C4:L11-16), which corresponds with Applicant's embodiment ({Applicant} [0022]). Regarding Claims 7-9, alicyclic polyether polyols are taught such as hydrogenated bisphenol A ({Takehana} C2:L66-67).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uchida et al. {Uchida} (WO 01/47824 A1) with evidence from Bicerano (*Predication of Polymer Properties*) and Furukawa (*Physical Chemistry of Polymer Rheology*).

Uchida teaches a coated optical fiber comprising an outer coating layer cured with a liquid composition comprising a urethane methacrylate, a polymerizable monomer of methacrylate-type, and initiator ({Uchida} Claim 1 | C3:L32-44). The amount of urethane methacrylate (A) is preferably 30- to 90-% ({Uchidad} P8:L10-14). The amount of polymerizable monomer (B) ranges from preferably 1- to 60-%. The photoinitiator (C) ranges from 0.1- to 10-% ({Uchida} P9:L26-28). Specific compositions are reported too ({Uchida} Table 1). Regarding Claims 4 & 5, the urethane methacrylate is based on a polyether based polyol, a diisocyanate, and a hydroxyl group-containing meth(acrylate) ({Uchida} P3:L4-14). Regarding Claims 6 & 7, as polyols for synthesizing urethane (meth)acrylate, Uchida teaches polyether diols such as polypropylene glycol ({Uchida} P5:L14-19). Regarding Claims 7-9, bisphenol A is taught as a suitable alilcyclic polyether diol ({Uchida} P6:L13-16). Given the molecular

weight of urethane meth(acrylate) and polyol precursors for synthesizing, a molecular weight of the polyol must be within the range claimed ({Uchida} P7:L28-P8:L3).

Uchida is silent regarding the glass transition temperature and relaxation time of the compounds. The composition taught, however, is substantially similar to the claimed invention. It comprises overlapping ranges of the urethane methacrylate polyether backbone, a polymerizable monomer, photo initiator, and subsequent limiting compounds. Compositions of the same materials would exhibit a similar range of properties. Evidence of the correlation between the polymeric material and its glass transition and relaxation time are clear: 1) glass transition is affected factors including structural, chemistry, molecular weight, & morphology ({Bicerano} Pages 179 & 180); and 2) glass transition time appears to be the only non-constant or non-integer factor in a general estimation of the relaxation time of a polymer ({Furukawa} Pages 146, 149, & 150 | Eqs. 16.27 & 17.1). Since the same polymeric materials generally exhibit the same properties, the polymer compositions appear to have the same glass transition temperatures and stress relaxation times as the claimed invention.

At the time of the invention, it would have been obvious to claim glass transition and relaxation time for the substantially similar optical fiber liquid coating composition {Uchida An intrinsic feature need not be recognized at the time to satisfy prima facie obviousness. Motivation to optimize the composition is based on the performance through mechanical properties and surface characteristics ({Uchida} P1:L6-9 & P8:L29-33). Thus, it would have been obvious to follow the teaching by Uchida to obtain the curable liquid resin composition.

10. Claims 10 & 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Takehana, et al. {Takehana} (US 6337118 B1) with evidence from Furukawa (*Physical Chemistry of Polymer Rheology*) as applied to Claims 1-9 or in the alternative over Uchida et al. {Uchida} (WO 01/47824 A1) with evidence from Bicerano (*Predication of Polymer Properties*) and Furukawa (*Physical Chemistry of Polymer Rheology*) as applied to Claims 1-9, and further view of Zahora et al. {Zahora} (US 6085010 A).

As discussed above, Takehana teaches a substantially identical photocurable adhesive resin composition with sufficient specificity comprising a methacrylate urethane, polymerizable monomer, and photo-initiator. The background of the composition is communication technologies requiring high speed conveyance of mass information ({Takehana} C1:L7-9), which corresponds generally with Applicant's use in optical fiber. As discussed above, Uchida teaches a coated optical fiber comprising an outer coating layer cured with a coating composition comprising a urethane methacrylate, a polymerizable monomer of methacrylate type, and an initiator. Takehana and Uchida are silent regarding the use of the resin composition as ribbon matrix and a modulus of particular strength.

Zahora teaches curable optical glass ribbon (matrix) assemblies comprising isocyanate, polyol, urethane methacrylates, and photoinitiators ({Zahora} C4:L66-C5:L7 | C7:L1-18). The polyol precursor materials also correspond with the claimed invention ({Zahora} C7:L1-C31:L44). These materials are advantageous because they provide a ribbon assembly that exhibits properties providing mid-span access to individual optical

glass fibers without additives, monomers, or oligomers containing fluorine or silicone as release agents in the ink coating, colored primary coating, or matrix material ({Zahora} C5:L57-61). Regarding Claim 12, Zahora teaches that the modulus is controlled by the average molecular weight of the oligomer, crystallinity, and diol composition ({Zahora} C7:L52-C8:L3 | C13:L9-24). Uchida teaches that temperature affects the modulus too ({Uchida} P9:L29-34). Thus, modulus is a result-effective variable based on at least polymer structure, polymer chemistry, and temperature and unpatentable as claimed.

At the time of the invention, it would have been obvious to one of ordinary skill to select amongst a finite number of known compounds for use in a substantially identical composition for coating optical fibers. It would have further been obvious to use the liquid curable composition for coating optical fiber {Uchida} in a ribbon matrix material {Zahora}. The motivation would have been to provide a ribbon assembly that exhibits properties providing mid-span access to individual optical glass fibers without additives, monomers, or oligomers containing fluorine or silicone ({Zahore} C5:L57-61). It would have further been obvious to use the liquid curable composition {Takehana} for coating optical fiber in a ribbon matrix material {Zahora}. The background of the composition is communication technologies requiring high speed conveyance of mass information ({Takehana} C1:L7-9). Zahora teaches that it is advantageous to use a similar composition for a ribbon matrix in an optical fiber without compounds that use fluorine or silicone ({Zahore} C4:L66-C5:L2 & C5:L57-61). Thus, it would have been obvious to combine Takehana or Uchida with Zahore to obtain the curable liquid resin composition.

Conclusion

Any inquiry concerning this communication should be directed to SHAWN R. HUTCHINSON whose telephone number is (571)270-1546. The examiner can normally be reached on 7 AM to 5 PM, M-H.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197. If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 or 571-272-1000.

/Shawn R. Hutchinson/
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